NON-LETHAL WEAPONS: A TECHNOLOGY GAP OR LACK OF AVAILABLE SYSTEMS, TRAINING, AND PROPER APPLICATION

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The Marine Air Ground Task Force Commander faces many challenges in the future operational environment. He must be prepared to address the full range of contingencies the future will undoubtedly present. This paper attempts to answer a critical question: can non-lethal weapons assist the MAGTF Commander to achieve his desired end state in the 2025 operational environment? This thesis argues that without a shift in culture and compelling new ideas, non-lethal weapons will remain a specialty item that never truly reaches its full potential. Advancements in non-lethal weapons technology, coupled with education and training on existing systems, will be paramount to ensure that non-lethal weapons are being employed to increase the likelihood of mission success. Creative and innovative mindsets that see the value in this technology will be necessary to adapt to every changing environment, and allow MAGTFs to prevail in the future operating environment. This study will address issues surrounding the employment of non-lethal weapons, and analyze several case studies to develop an answer to the primary research question. In conclusion, the reader will note the capability of non-lethal weapons, and determine whether they present a possible means to achieve a desired end state in the future operating environment.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

NON-LETHAL WEAPONS: A TECHNOLOGY GAP OR LACK OF AVAILABLE SYSTEMS, TRAINING, AND PROPER APPLICATION, by Major Bryce W. Carter, 77 pages.

The Marine Air Ground Task Force Commander faces many challenges in the future operational environment. He must be prepared to address the full range of contingencies the future will undoubtedly present. This paper attempts to answer a critical question: can non-lethal weapons assist the MAGTF Commander to achieve his desired end state in the 2025 operational environment? This thesis argues that without a shift in culture and compelling new ideas, non-lethal weapons will remain a specialty item that never truly reaches its full potential. Advancements in non-lethal weapons technology, coupled with education and training on existing systems, will be paramount to ensure that non-lethal weapons are being employed to increase the likelihood of mission success. Creative and innovative mindsets that see the value in this technology will be necessary to adapt to every changing environment, and allow MAGTFs to prevail in the future operating environment. This study will address issues surrounding the employment of non-lethal weapons, and analyze several case studies to develop an answer to the primary research question. In conclusion, the reader will note the capability of non-lethal weapons, and determine whether they present a possible means to achieve a desired end state in the future operating environment.

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ACRONYMS

AFRL	Air Force Research Laboratory
DIME	Diplomatic, Informational, Military, Economic
DOD	Department of Defense
EOF	Escalation of Force
HECOE	Human Effects Center of Excellence
MAGTF	Marine Air Ground Task Force
NGO	Non-Governmental Organization
OOTW	Operations Other Than War
USAID	U.S. Agency for International Development

CHAPTER 1

INTRODUCTION

> The ability to enable civil-military and combat operations simultaneously, is the essence of the force as a "two-fisted fighter"–capable of offering an open hand to people in need or a precise jab to an adversary in an irregular warfare environment; while at the same time, ready to wield a closed fist in the event of major combat operations.[1]
>
> — United States Marine Corps
> *Marine Corps Vision, and Strategy 2025*

Marine Air Ground Task Force (MAGTF) commanders train and equip their Marines to understand and defeat adversaries in complex settings. In the future environment, new technology must provide precise effects that minimize bodily harm and collateral damage while simultaneously protecting the lives of their Marines. The public, media, and our politicians will expect nothing less. Non-lethal technologies have provided a suitable solution for specific situations on the battlefield, and the Department of Defense is investing millions of dollars developing new systems to meet current gaps in technology.[2]

Although non-lethal weapons have provided a technology short of weapons meant for war that can counter personnel, the potential for these weapons to have lethal effects is well documented. These weapon systems are intended to disable vehicles and vessels, or force a behavior by pain compliance. The potential for undesired lethal effects exists and that is unlikely to change in the timeframe this paper is reviewing.

International law allows for the targeting of enemy military personnel and supplies, and the Geneva Convention provides a framework for what is an acceptable application of force during wartime. To be successful in current and future engagements,

commanders are aiming to neutralize the enemy and minimize the impact to the civilian population. Enemy forces are well aware of protocols that require proportionality and the requirement to limit impacts to the civilian populace. The U.S. military is required to get the balance right, and therefore enemy forces will continue to operate among non-combatants or in an environment with non-combatants, in an attempt to gain a tactical advantage that could lead to strategic mistakes.

The past decade-plus of wars (2003-2016) and recent contingency operations have identified a very alarming trend that is likely to increase throughout the twenty-first century. Contact with the civilian populace during all phases of the operation will occur. The Marine Corps is designed to operate in and around littorals and 80 percent of the world's population just so happens to live in these areas.[3] Conflict tends to occur where people live. This challenge will continue to grow with the urbanization of our world. Migrants and displaced persons are moving to informal settlements in cities that do not have the infrastructure, public services, or resources to support them. Military commanders must understand both their enemies and the cultural, societal, and political factors of these complex environments.

As the Marine Corps prepares for the future operating environment, they must adapt to an increased presence of noncombatants. Formally known as "fleet marine forces," Marine Air Ground Task Forces (MAGTFs) provide combined arms units, together with supporting air components. These MAGTFs provides the primary means to engage with partners, assist victims, or strike with determination when required.

The global population is continuing to grow, and it is concentrated within the littorals. More than 60 percent of the Earth's population will live in urban areas in 2025.[4]

The majority of this growth is projected to occur in urban areas where access to jobs, food, and potable water will not meet the demand. A large percentage of the growth will be underemployed adolescents. Globalization will continue, increasing the velocity and degree of interaction between societies. Extremist groups will continue to exploit this young, poorly educated demographic to incite violence and further their agendas.

The scarcity of fresh water will become a fight for survival. More than a billion people do not have adequate access to water, and this trend will only grow with the increase in population. By 2025, more than half the global population will live under water-stressed or water-scarce conditions. MAGTFs must be prepared to deploy into these areas to work alongside USAID and NGOs, and assist to relieve human suffering.[5]

The future operational environment will be more densely populated and urbanized. Media from the international community will be reporting human suffering. Operating in these urban centers will pose extraordinary challenges. As difficult as the physical aspect of operations in this environment will be, the cultural terrain will be more complicated to traverse. The ability to comprehend and effectively maneuver in the cultural dimension of the modern operational environment is paramount. While the threat of state-on-state warfare featuring the destructive capabilities of major powers has declined, it remains a distinct possibility. It still must be regarded as the most dangerous threat to the United States. The dilemma facing the Marine Corps is that it must maintain the ability to wage successful campaigns against large, conventionally armed states and their militaries, widely dispersed terrorists, and everything in between.

The United States still seeks to support stability in the international community. The range of missions that must be fulfilled demand a discriminating, multi-capable

force. This force must be highly trained and educated to function against evolving foes in both current and emerging operational environments. The United States requires very capable forces, covering the greatest range of tasks, at an affordable cost that can minimize the risks inherent in an unforeseeable future. MAGTFs will be required to adapt to these emerging challenges in the future. By law, the U.S. Marine Corps must continue to be the nation's expeditionary force in readiness.[6]

Primary Research Question

The primary focus of this research paper will be to determine, how does the MAGTF Commander employ non-lethal weapons in the 2025 operational environment?

Secondary Research Questions

What is public opinion on the employment of non-lethal weapons? Is the DOD developing relevant capabilities for the future threat and environments? Can Marines carry existing non-lethal weapons equipment without giving up critical lethal capability?

Assumptions

This paper assumes that the conduct of future warfare will include combinations of conventional and unconventional as well as lethal and non-lethal military action. A MAGTF must be able to execute full spectrum operations while minimizing noncombatant fatalities and collateral damage. Trends point to shifts in the character and forms of future warfare. Many states will improve their conventional capabilities, and states and non-state actors alike will be able to acquire lethal capabilities. Hybrid challenges will combine conventional war, irregular challenges, terrorism, and criminality. States, non-state actors, and terrorist organizations seeking to delegitimize

allied governments will create hybrid challenges. One purpose of these operations will be to impose excessive political, human, and materiel costs in order to undermine their adversary's resolve and commitment. MAGTF's will have the ability to employ selected next generation non-lethal weapons. This paper also assumes that the application of non-lethal weapons will enhance a commander's ability to achieve success. Combatant Commanders will require MAGTFs to respond to the 2025 environment with actions that are consistent with the Nation's values and commitments of minimizing collateral damage and human suffering. This paper assumes (1) that enemies will not adhere to rules, and (2) many of our actions or inactions may have strategic consequences. There is no technological or doctrinal formula that can ensure military success. Finally, this paper assumes that the case studies from David Koplow's book, *Non-Lethal Weapons, the Law and Policy of Revolutionary Technologies for the Military and Law Enforcement* is an appropriate selection to assess a model for analyzing the research conducted.

Definitions

Terms defined as part of this thesis are described below. These terms are used within the context of this thesis in these manners.

Active Denial System (AD). A non-lethal, directed-energy weapon developed by the U.S. military, designed for area denial, perimeter security, and crowd control. Informally, the weapon is also called the heat ray, since it works by heating the surface of targets, such as the skin of targeted human subjects.

Blunt Force Objects. Intended to cause temporary pain or injury and can take the form of projectiles, batons, beanbags, liquid filled munitions, and water cannons, among others

Collateral Damage. A general term for unintentional deaths, injuries, or other damage inflicted incidentally on an unintended target. In military terminology, it is frequently used where non-combatants are unintentionally killed or wounded and non-combatant property damage results of an attack on a legitimate military target

Conventional Weapons. Weapons that destroy their targets principally through blast, penetration, and fragmentation.

DIME. The elements of national power, Diplomacy, Information, Military, and Economic.

Direct Energy Weapons. Emits highly focused energy, transferring that energy to a target to damage it.

Discrimination. A treatment or consideration of, or making a distinction in favor of or against, a person or thing based on the group, class, or category to which that person or thing is perceived to belong to rather than on individual merit

Electronic Weapons. Energy devices that use pain and muscle tenancy (involuntary muscle convulsion) to affect the targeted person.

End State. The objective of the military task in form of a representation of the desired outcome. The desired outcome is described as a state, e.g., completion of a task, the effects from tasks, or even the execution of tasks over time. The purpose is to provide a picture of the End-State.

Escalation of Force. A military term for increasing the level of appropriate violence in a given incident.

Force Continuum. A standard that provides law enforcement officers and civilians with guidelines as to how much force may be used against a resisting subject in a given situation. In some ways, it is similar to the U.S. military's escalation of force (EOF).

Hailing and Warning. Messages that can sent through optical and acoustic means.

Human Effects Research. Human effects research with regards to non-lethal weapons spans the entire breadth of non-lethal weapons stimuli focusing on characterizing non-lethal effects, quantifying risk of injury, studying behavior response, and building, verifying, and validating predictive models and simulations for non-lethal effects and effectiveness.

Irritant Sprays. Meant to disable an individual by shooting a foam or spray containing an irritant capable of causing temporary blindness, intense pain, and trouble breathing.

Just War Theory (*jus bellum iustum*). A doctrine, also referred to as a tradition of military ethics, studied by theologians, ethicists, policy makers, and military leaders. The purpose of the doctrine is to ensure war is morally justifiable through a series of criteria, all of which must be met for war to be considered just.

Littorals. Regions situated next to the sea.

Marine Air Ground Task Force (MAGTF). A balanced air-ground, combined arms task organization of Marine Corps forces under a single commander that is structured to accomplish a specific mission.

Noncombatants. A person who is not engaged in fighting during a war, especially a civilian, chaplain, or medical practitioner.

Non-Lethal Weapons. Also called less-lethal weapons, non-deadly weapons, compliance weapons, or pain-inducing weapons are weapons intended to be less likely to kill a living target than conventional weapons, or less likely to cause undesired damage or impact on the environment.

Proportionality. A logical method intended to assist in discerning the correct balance between the restriction imposed by a corrective measure and the severity of the nature of the prohibited act.

Revolution in Military Affairs. A military-theoretical hypothesis about the future of warfare, often connected to technological and organizational recommendations for change in the U.S. military and others.

Spetsnaz. Umbrella term for Special Forces in Russia.

Limitations

This paper will explore the effectiveness and ineffectiveness of non-lethal weapons's during previous military and para-military operations from 1990 to the present. This paper will also review case studies where non-lethal weapons were or were not available for employment, and determine if they did or could have assisted in achieving desired tactical, operational, and strategic end states. This study was conducted over a constrained period with limited access to resources available to conduct research while ensuring the document remains unclassified. The author has personal experience with the employment of non-lethal weapons in Iraq, which may create bias in collecting and analyzing data. Many of the interviewees are acquaintances of the author and have training and experience with the employment of non-lethal weapons. This paper attempts to mitigate such biases through multiple means explained later.

Scope and Delimitations

The study will focus on current non-lethal weapons and emerging technologies that will be available to MAGTF commanders in 2025. Research will address employment of non-lethal weapons in both garrison and the operational environments (traditional versus irregular warfare) and why commanders are reluctant to train on and employ existing non-lethal technologies. Research will also address if non-lethal weapons can enhance a commander's ability to escalate force and reach the desired end state while minimizing harm to people and infrastructure. This study will not review classified case studies.

Significance of Study

The study will assess the feasibility and suitability of employing non-lethal weapons in the future operational environment. Military leaders at the highest levels contend that the application of non-lethal weapons provides an option short of lethal force, yet many choose not to train on or employ available weapons for myriad reasons. This paper attempts to determine whether current or emerging non-lethal weapons technologies can assist MAGTFs in achieving results that would limit human suffering, collateral damage, and assist in reaching desired end states. This paper also attempts to determine if a change in culture is necessary to increase training and employment of this technology.

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[1] Marines.mil, "Marine Corps Vision and Strategy 2025," accessed 13 October 2015, http://www.marines.mil/News/Publications/ELECTRONICLIBRARY/ElectronicLibraryDisplay/tabid/13082/Article/125897/marine-corps-vision-strategy-2025-low-resolution.aspx.

[2] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., *An Assessment of Non-Lethal Weapons Science and Technology* (Washington, DC: National Academies Press, 2003), 1-5.

[3] Greg Laden, "How Many People Live Near the Ocean?," *Science Blogs*, 18 October 2011, accessed 8 April 2016, http://scienceblogs.com/gregladen/2011/10/18/how-many-people-live-near-the/.

[4] Marines.mil.

[5] Ericsson.com, "Networked Society–the Next Age of Megacities," 2013, accessed 5 November 2015, http://www.ericsson.com/res/docs/2013/the-next-age-of-megacities.pdf.

[6] Department of Defense, Directive 5100.01, *Functions of the Department of Defense and Its Major Components*, 21 December 2010, accessed 19 April 2016, http://www.dtic.mil/whs/directives/corres/pdf/510001p.pdf, 31-32.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study is to examine whether non-lethal weapons can assist MAGTF's actions in the future operating environment to achieve their desired end states. The literature review will familiarize the reader with the principal schools of thought regarding non-lethal weapons to provide a greater understanding of the analytical framework used later in this paper to determine the utility of such technologies. This chapter explores both the academic and scholarly efforts made during the past twenty-five years of military operations other than war (1990 to 2015). The intention is to identify possible ethical problems with military use of non-lethal weapons, and determine whether scholars and experts consider current capabilities and developing technologies as means to assist commanders with reaching desired end states.

Literature and information comes from four major sources: (1) periodicals, magazines, legal reviews, and websites; (2) *USMC Vision and Strategy 2025*; (3) Department of Defense directives, commissioned governmental reports and instructions for non-lethal weapons; and (4) the book, *Non-Lethal Weapons*, by David A. Koplow.

Upon reading about non-lethal weapons, the 2025 operational environment, and international law governing the use of force, one can find similar information and concepts throughout all three major categories. For example, a contributor of scholarly opinion editorial will often comment or even make similar recommendations as an author contributing to an international law review. Although topics may appear similar, the amount of analysis, background information, and thoroughness of recommendations

differ among all sources. Each source offers unique perspectives to gauge consensus or predominant conclusions. This will categorize each of the broad sources to more accurately classify, organize, and depict the existing information on the topic of non-lethal weapons.

Many articles and essays in scholarly journals and magazines cover the subject of non-lethal weapons and their employment in both para-military and military operations. Most of this literature can be subdivided into three categories: (1) in opposition to non-lethal weapons; (2) in favor of non-lethal weapons; and (3) neutral positions on non-lethal weapons.

In Opposition to Non-Lethal Weapons

The first category suggests that international law has not caught up with emerging non-lethal weapons, and the consequences of employing these technologies have not been realized fully. *Jus in Bello,* or just war tradition, has principles that are defined with varying degrees within international law.[1] Two of the central principles are discrimination and the proportionality of means. The principle of discrimination suggests that every effort will be made to distinguish between combatants and non-combatants during armed conflict. The proportionality of means requires that the force or weapon employed be morally comparative to achieve the desired end state.[2] The legal concern with the employment of non-lethal weapons is that commanders will use them to circumvent the proportionality of means, thus making it irrelevant.

Pauline Kaurin, a contributor to the Journal of Military Ethics suggests that it is morally impermissible to use non-lethal weapons as an “easy” fix to complex strategic environments or as a method to make war more acceptable as a political or military

option.[3] She proposes that non-lethal weapons can be ethical and may, in fact, be favored over conventional weapons to reduce suffering, facilitate the restoration of peace, and limit casualties. The major concern that remains among many of the legal experts is that non-lethal weapons will be employed in a less discriminate manner because of the premise that they might cause disproportionate harm.

Christian Enemark from the University of Sydney continues the *jus in bello* discussion, further defining discrimination as the act of avoiding deliberate attacks on the innocent. He goes on to state that the proportionality of means requires that enemy combatants shall not be subjected to unnecessary suffering.[4] He suggests that *jus in bello* rules imply that non-violent alternatives should not be introduced as alternatives to the use of force. However, he later counters that some situations, where force is necessary and legitimate, lead to a debate in regards to the use of non-lethal weapons, and whether they are the proper tools for the level of harm needed to be generated by that force.

Barbara Rosenberg, Director of the Chemical and Biological Weapons Program of the Federation of American Scientists, challenges the use of riot control agents in warfare, claiming that they violate two international treaties. Domestic law enforcement is not defined in these treaties, which allows for the development of said chemical agents. However, Title 10 Department of Defense personnel who employ them in warfare would be in violation.[5]

The employment of non-lethal weapons against groups of civilians has become a hot button issue in recent years, especially in the wake operations in Iraq and Afghanistan. Eve Massingham, International Humanitarian Law Officer with the Australian Red Cross, cautions that the principle of proportionality prohibits military

action where injury to civilians or their property would be excessive in relation to the direct military advantage gained. The author concludes that according to international law, the use of force is not authorized against civilians not directly participating in hostilities, and that these weapons have often been used in situations where lethal force would not have been authorized. However, she also concedes that the line is difficult to draw when militaries are exercising police powers during peacekeeping operations.[6]

Authors like Stephen Coleman, Program Director for Military Ethics at the School of Humanities and Social Sciences, University of New South Wales, propose that the advancement of new technologies raises ethical issues when weapons are tested differently during the development stage than in their practical application in the real world.[7] The author suggests that it is possible for some of these non-lethal weapons to be used in a discriminate and proportional way, but international law has been unable to keep up with the changing nature of warfare. In his conclusion, he states that there is near certainty that these weapons will be misused if issued to military personnel.[8]

Jonathan Moreno, from the University of Virginia, a contributor to the American Journal of Bioethics, has serious concerns regarding the potential loopholes in the Chemical Weapons Convention and the fact that they may be just ambiguous enough to allow for the development of dangerous non-lethal agents. He believes an unbiased, respected organization such as the Institute of Medicine should study any emerging technologies to determine if they are medically ethical.[9]

Many authors agree that the idea of non-lethal weapons is politically attractive yet misleading. Steven Aftergood, a Senior Research Analyst at the Federation of American scientists, believes that the futuristic appearance of non-lethal weapons is seductive, but

that media reports have not critically reviewed them. He claims that political and legal questions on the value of them are still unasked and, more importantly, unanswered.[10]

Considerable skepticism and opposition still exist toward the ethical employment of non-lethal weapons in military operations. Sjef Orbons, who serves on the facility of Military Sciences at the Netherlands Defence Academy, argues that non-lethal weapons can provide a military force with a "license to silence" when the use of lethal force would be prohibited or undesirable. He concludes that the occurrence of abuse is impossible to rule out as non-lethal weapons can be employed in a harmful manner while leaving little to no traces on the victim.[11]

In Favor of Non-Lethal Weapons

The second category: periodicals, magazines, and journals imply that non-lethal weapons have a place in armed conflict, suggesting that they may provide the commander with a suitable alternative, specifically in situations where the balancing of proportionality would allow for military action. For example, a scenario where the desired effect is to disperse or neutralize human shields could be an appropriate use of these technologies even though it would not legally constitute an obligation for employment.

Ofer Friedman from the University of Reading, United Kingdom, believes there is a pressing need for integrated non-lethal weapons to provide the military with the ability to minimize collateral damage and non-combatant casualties. To meet this necessity, he insists that the Department of Defense (DOD) and its joint non-lethal weapons program must translate that need and incorporate it into DOD directives, policies, and requirements.[12]

Some authors argue that non-lethal weapons can be used to identify combatants from innocent bystanders. Dr. Alan Ashworth, chief scientist for the Air Force Research Laboratory (AFRL) Human Effects Center of Excellence (HECOE), proposes that research models must account for human factors and the motivation of individuals. Warning shots or non-lethal effects will not always dissuade bad people from approaching their objective, while the innocent will likely turn back or be subdued when engaged with something like pepper spray.[13] Italian Navy Rear Admiral (Ret) Massimo Annati, who currently serves as the Chairman of the European Working Group on non-lethal weapons, suggests that hailing and warnings can often have the same identifying effect on malicious or innocent actors in the maritime environment.[14]

Edward Lundquist, a special correspondent for SEAPOWER magazine, suggests that non-lethal weapons provide the end user with asymmetric alternatives that have both physical and psychological effects on people. Researchers are currently studying "approach and avoidance behavior," and the results are intended to show how people make yes-or-no decisions to continue their actions when either warned or confronted. Deciphering this behavior is a skill that would be highly desirable to a commander dealing with a complex problem where combatants and noncombatants are indistinguishable.[15]

David Koplow, a Professor of Law at Georgetown University, suggests that the Department of Defense should be more ambitious when it comes to developing non-lethal weapons. He believes that the current operating environment requires military personnel to carry both "bullhorns and bullets," thereby widening their arsenal of defensive and offensive tactics. Providing technologies that are designed to fill the gap are needed;

however, there will rarely be a scenario where deadly force will not be necessary for self-defense.[16]

Based on reviews of recent operations in Afghanistan, human effects scientists, Wesley Burgei and Shannon Foley, along with Air Force Lt Col Scott McKim, state that non-lethal weapons provide the commander with options for escalation and de-escalation of force that will make their units more effective. According to them, the Human Effects Review Board (HERB) is improving the review of emerging technologies, ensuring they capture the potential human effects risks and provide recommendations to mitigate those risks. This board is expected to improve the development of emerging technologies and ensure commanders that they will work as intended.[17]

Since the conclusion of the cold war, the United States military has been engaged in stability operations. James Linder, a contributor to Military Review argues that non-lethal weapons provide the missing piece on the rules of engagement between minimal and lethal response. He concludes that they provide the operational commander a high degree of flexibility and assist him with controlling the escalation of force, thus reducing violence.[18]

Neutral Positions on Non-Lethal Weapons

In the third subcategory, authors suggest that commanders will not employ non-lethal weapons until they are educated on the available technologies and see them as a viable alternative to increase the survivability of their force or help them achieve the desired end state. Lethal force is authorized in warfare, but something that allows commanders to achieve the desired effect while at the same time limiting casualties or collateral damage is often preferable. Some of the researched literature theorized that a

conscious decision to employ non-lethal weapons would limit casualties and collateral damage, thereby reducing further civilian suffering that may have resulted from the birth of new insurgents in the aftermath of a conflict.[19]

Currently, there are situations where lethal force is authorized to protect the force, but the employment of non-lethal riot control agents is banned. In such situations, the employment of riot control agents might be preferable, but the United Nations Chemical Weapons Convention has not yet approved such employment outside of domestic use in a law enforcement capacity.[20] Colonel George Fenton, Former Director of the US Joint Non-Lethal Weapons Directorate submits that he "would like a magic dust that would put everyone in a building to sleep, combatants and non-combatants."[21] Whether or not a capability like this might be possible, the question remains whether or not it is moral or ethical.

The European Working Group on Non-Lethal Weapons opines that the development of these technologies will provide the military with an acceptable alternative to lethal force.[22] The question that was posed by authors throughout this research is how do we get this balance right? Major General Peter Chiarelli of the U.S. Army stated in 2007 that, "We are good at lethal effects; but in a counterinsurgency, non-lethal effects are as important . . . non-lethal effects are critical to winning the war in Iraq. So, if we are really serious about fighting an insurgency, we have to change our culture and accept the importance, and sometime preeminence, of non-lethal effects."[23]

Several authors believe that the rapid advances occurring in non-lethal weapons technology is in response to the "CNN effect" in war zones. Media records the brutality of conflict, and the public responds with disgust and questions military leaders and policy

makers. Nick Lewer, Director of the Centre for Conflict Resolution at the Department of Peace Studies, University of Bradford, believes that this effect is encouraging politicians, military, and paramilitary leadership to seek alternatives to lethal force, specifically when challenged with operational environments that contain civilians.[24]

Asymmetrical warfare provides an environment where the risk of disproportionate, unnecessary, and intentional harm is more likely than a traditional conventional fight between two relatively equal opponents. Michael Gross, from the University of Haifa, Israel, suggests that non-lethal weapons can provide an alternative response to disproportionate harm. He argues that non-lethal weapons provide a wider range of options within the "force continuum."[25]

Courtney Howard, a contributor to Military and Aerospace Electronics magazine, believes that from 2013-2023, non-lethal weapons will emerge as a key domain for asymmetric warfare. Homeland Security Research Corporation anticipates that the emerging non-lethal weapons market will triple by 2020.[26]

Beyond general similarities found within the research, the authors of most articles and periodicals explore other related topics that provide useful information. First, many writers find discrepancies between the intent and actual application of non-lethal weapons. Manufacturers boast about the safety of their products, but almost all are labeled with warnings of potentially life threating effects. Testing is always done in controlled environments with healthy subjects of a particular age group and readily available medical personnel.[27] Susan Levine, Principal Deputy, Strategy, and Policy of the DoD Joint Non-Lethal Weapons Directorate, identified several legal requirements that prevent testing on certain groups of people such as those with existing medical

conditions or children.[28] When employing these weapons systems in a military scenario, the controlled environment of padded landing surfaces and healthy subjects will rarely, if ever, be the reality.

Several authors, over the past decade or so, suggest there has been a fundamental shift in the conduct of war, and a revolution in military affairs is occurring. Various authors even argue that non-lethality is a part of it. Steven Metz, a research professor of National Security Affairs at the Army War College, suggests traditional wars between nations will not be the primary challenge going forward, and, in all likelihood, non-lethality will be key in responding to new threats. He believes the development of non-lethal weaponry will "create a need for altering or reconstructing the political and normative framework of armed conflict." This is a challenge that will likely require a culture shift in the military.[29]

In 2006, Richard Jackson, the Special Assistant for Law of War Matters, International and Operational Law Division, Office of the Judge Advocate General, conducted a review of laser employment as a non-lethal warning device in Iraq. He concluded that there is no legal impediment to their deployment, and that the result may be fewer unnecessary casualties during convoy and check point operations.[30]

From an international law perspective, there are several caveats that have been universal throughout almost all of the legal sources researched. The first caveat is that the development of non-lethal weapons should not be intended to avoid the principle of discrimination. End users must be required to continue to employ them with moral judgment, and labeling a weapon system as "non-lethal" should not change this fact. The second caveat is that these technologies cannot be seen as a way to avoid following the

rules of engagement. Picture a humanitarian assistance scenario in which the military wants to provide protection to non-combatants in a situation where there may be combatants in disguise who intend to create an international incident. Non-lethal weapons may provide a solution, but they cannot be expected to be a universal remedy. The third caveat is that non-lethal weapons development should not be seen as a way to make war more acceptable, either ethically or politically. If these technologies make military employment or action more desirable because the political fallout may be more manageable, then an ethical line is likely being crossed. Moral and ethical lines must always remain in place to protect the sovereignty of people and nations.[31]

Future Operating Environment

The *U.S. Marine Corps Vision and Strategy 2025* was selected to define what the future operating environment might look like. This document provides a preview of the anticipated future security environment and the threats and challenges that commanders can expect to face. The document states that the Marine Corps is adapting to this "unpredictable future" by training and equipping the force to defeat our adversaries in a complex conflict. The focus for the training and educating programs is to provide skills that enable civil-military operations. The authors envision an expeditionary environment where the complexity is increasing due to the increased number of non-combatants that can be expected in the urbanized littorals where the Corps will operate.

The Vision and Strategy document anticipates that population growth will continue in urban areas, and by 2025, more than half the world will not have adequate access to clean water.[32] Many combatants will be non-state actors who adhere to no rules, while Marine "actions or in actions could have strategic consequences". When facing

these challenges, an important rationale to consider comes from the *U.S. Army and Marine Corps Counterinsurgency Field Manual FM 3-24*, which states that excessive use of military force can frequently undermine the policy objectives at the expense of achieving the higher political goals.[33]

Department of Defense Directives, Commissioned Reports, and Instructions

Of doctrinal significance to this research, Department of Defense Directive 3003.03E provided answers to the Department of Defense's stance on the development, testing and evaluation, assessment of military utility, acquisitions programs, and employment of fielded non-lethal weapons. This publication states that non-lethal doctrine and concepts of operations will be developed to reinforce deterrence and expand the range of options available to the commander. It further defines how non-lethal weapons have the potential to enhance this ability and how these weapons are unlike conventional weapons. Finally, it prescribes how developers will conduct thorough human effects studies, and that the presence of non-lethal weapons will not constitute an obligation for their use outside of existing rules of engagement or other rules of force.[34]

Commissioned government reports represent another source of valuable information. The reports provided two critical insights. First, the authors identified the potential for non-lethal weapons to help meet the overall demands that commanders face in future operating environments. Second, the authors identified readily apparent issues associated with future development of these technologies that are inherently more complex than the development of their lethal counterparts.[35]

Summary and Conclusion

The literature review conducted an assessment of current literature surrounding the topics of non-lethal weapons technologies. Authors of diverse sources provide useful information, guiding principles, and potential non-lethal weapons solutions to the many challenges that commanders face in complex operational environments. Many scholars and journalists have identified the employment of non-lethal weapons as a potential facilitator to reaching desired end states while minimizing collateral damage or casualties to combatants and non-combatants alike. The existing literature can collectively contribute to answering the primary research question.

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CHAPTER 3

RESEARCH METHODOLOGY

Introduction

This paper will continue to explore the primary research: will current or emerging non-lethal weapons technologies assist MAGTFs in achieving their desired end states in the future operational environment? The chapter explores the methodology used throughout the paper that will assist the reader with understanding the analysis presented in later chapters. This chapter will be organized into four sections. First, the overall approach and rationale will provide the steps taken by the researcher to conduct research and analysis to answer the primary and secondary research questions. The second section will be a description of the primary case studies, which will be analyzed to develop general themes and make interpretations through in-depth data collection involving multiple sources of information.[1] Third are the data-gathering methods used to determine the credibility of sources, relevance to the topic, and currency of the data. In order to fully define the analytical framework used to assess non-lethal weapons employment later in the paper, this chapter will explore the insights and best practices identified by the Joint Staff J7's *Integration of Lethal and Nonlethal Actions* paper; the National Resource's, *An Assessment of Non-Lethal Weapons Science and Technology*; and *Non-Lethal Weapons* by David Koplow. The fourth and final section will be the Data Analysis Procedures.[2]

Overall Approach and Rationale

The research methodology used to answer the primary and secondary research questions is a qualitative approach. Qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures; collecting data in the proper setting; analyzing the data inductively, building from particulars to general themes; and making interpretations of the meaning of data.[3] This allows for a comprehensive and historical interpretation of facts concerning this thesis, which are difficult to express simply with numbers and charts. Because people react differently across a population, it is nearly impossible to describe the effects of non-lethal weapons in a quantitative approach.

Various types of qualitative research strategies can be applied. For the purpose of this paper, a multi-site case study strategy of inquiry is used to examine the effects of non-lethal weapons employment. These case studies qualitatively describe the effects at a given location and time to provide historical data to answer the primary and secondary research questions.[4] A case study strategy is well suited for this research because the nature of operations reviewed does not preclude controlled behavioral effects by the personnel involved. This approach also allows for a thorough investigation of the strengths, weaknesses, and lessons learned from the chosen case studies.

Before discussing the criteria further, it is important to understand the definition of a case study. A case study is a holistic look at a recent event and the environment in which it took place, especially when the borders between incident and the environment are not clear.[5] With the employment of non-lethal weapons, the delineation between the

incident and the environment in which it occurs are not separable. This is typically the case in a chaotic situation where there are effects on humans.

The primary disadvantage to this research strategy is that it is based on the interpretation of data by the researcher. There is an inherent risk of biases that might not exist from a quantitative research method that tested objective theories by examining the relationship among variables.[6] However, this risk will be mitigated by selecting a wide range of well-known case studies from which to analyze, to provide findings that are considered trustworthy and reliable. Another disadvantage inherent to this method is the requirement to state what information is used and researched during the discovery phase of this thesis.

The first step in this methodology analyzes the operational environment in 2025. Marine Corps' vision and strategy documents, and other references that attempt to predict what the future environment might look like, provide the framework to briefly define the operational environment for the MAGTF Commander in 2025.

The second step in this methodology investigates recent military operations (1996-2015), and reviews if and how non-lethal were employed. This research focuses on case studies that provide relevant information that assists in answering the primary and secondary research questions.

The third step in this methodology analyzes how conceptual systems could have enhanced a commander's ability to reach a desired end state. The information for this methodology already exists, so no generation or outside collection of external data was required.

Case Selection

The examination of three separate cases will assist in answering the primary and secondary research questions. The first case study is from a major uprising of detainees at Camp Bucca, Iraq, in January 2005. Non-lethal weapons and lethal weapons were both employed during this event. The exchange ended with four detainees shot dead and another six wounded by soldiers armed with M-16 rifles.[7]

The second case study is an engagement between the Russians and the Chechens in Moscow in 2002. Fifty Chechen terrorists entered a theater, seized control, and locked down a three-story facility with roughly eight hundred people inside for a performance. The Chechens threatened to kill everyone inside unless Russia ended its military campaign in Chechnya and withdrew its forces. Non-lethal and lethal force was employed to regain the facility. In the end, all fifty Chechen terrorists were killed, along with 129 hostages. None of the assaulting Russian Spetsnaz troops were killed, and only nine were injured.[8]

The final case study is an instance of conventional military combat in urban terrain in the city of Basra, Iraq, in 2003. In command of the city was the notorious Ali Hassan al-Majid, also known as "Chemical Ali," who had roughly two thousand fighters at his disposal. The British quickly surrounded the city, but were initially reluctant to enter for fear there would be significant collateral damage and civilian casualties. A stalemate ensued for roughly two weeks, during which the civilian residents were without access to drinkable water and electrical power. Instead of becoming the hoped-for, easy victory, the British became bogged down and blamed for the slow pace of humanitarian relief. Eventually the British launched several small-scale operations to secure key parts

of the city, at which time the residents welcomed the coalition forces and even assisted with the removal of remaining police and Baathists. At the conclusion, humanitarian aid began to flow in and restore electricity and running water, but not without significant damage to infrastructure due to the fighting and looting that took place.[9]

The first two case studies represent real-world engagements where non-lethal and lethal weapons were employed, and extensive data exists to determine successes and failures. The final case study portrays a conventional fight with defenders employing asymmetric tactics of guerrilla warfare, terrorist activities, and patently illegal maneuvers in urban terrain, and a coalition force that had no mechanism to separate hostile forces from the civilians.

Data-Gathering Methods

Primary data gathering utilizes open source data provided by government organizations and respected scholars. The research was conducted through the analysis of official publications, supporting documents, and published literature, specifically the Deployable Training Division, Joint Staff J7, National Research Council Committee for an Assessment of Non-Lethal Weapons Science and Technology, the Naval Studies Board, and David Koplow, provided multiple reports and assessments that each focus on the effects of non-lethal weapons.[10] As feasible, the author met with government organizations involved with development, training, and employment of non-lethal weapons to confirm the validity of this literature. The purpose of these meetings was to collect additional data or after action reports that are difficult to acquire or unavailable through open source research. In order to provide additional vantage points on the employment of non-lethal weapons, data was collected from international news agencies

and social media sites to assist in providing the human response to the effects of non-lethal weapons employment or a lack thereof.

Data Analysis Procedures

Data analysis in quantitative research includes preparing and organizing data, subcategorizing by themes, and presenting the data in figures, tables, or discussion.[11] This will assist in confirming effects or producing a more holistic look at the different effects that each source does not account for. This framework will be used later in this paper to determine the utility of such technologies.

Summary

This chapter presented the research methodology utilized to complete chapter 4. Case studies present a valid approach to probing questions in which the answers are not always straightforward. Given the limitations of this study, it would more difficult to use a different methodology to answer the primary and secondary research questions regarding human interaction and reaction in the environment in which these events took place. The case study approach allows the inclusion of these external factors pertaining to the conclusion and recommendations provided in chapter 5.

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CHAPTER 4

ANALYSIS

The objective of this thesis is to determine how non-lethal weapons can assist MAGTF commanders operating in the 2025 environment with achieving desired end states. For the purpose of this research, specific case studies were selected and analyzed in order to develop an answer to the primary research question.

This analysis will be organized into six sections: (1) Non-lethal weapons within the DOD: history and policy, (2) international legal constraints, (3) case study analysis, (4) primary research question analysis, (5) secondary research question analysis, and (6) summary. The primary research question will be analyzed and focused on determining whether non-lethal weapons could assist commanders in a projected 2025 operating environment. The secondary research questions will be analyzed to provide background information that will assist with answering the primary research question and drawing conclusions. Military operations are often complex, and with the current and emerging non-lethal technologies researched, the author will not be able to provide an absolute response.

Non-Lethal Weapons within the DOD: History and Policy

The Joint Non-Lethal Weapons Directorate was established in 1996 shortly following U.S. Marine Corps Lieutenant General Zinni's invocation of non-lethal weapons to assist in the withdrawal of UN forces from Somalia in 1995. DOD Directive 3003.3 was the fundamental charter in 1996 that led to the creation of the Joint Directorate.[1] The Directorate has five defined missions: (1) identifying and

understanding current and projected operational requirements and capability gaps; (2) identifying and developing technologies into operationally suitable and effective less lethal solutions that are cost effective; (3) facilitating the acquisition and fielding of less lethal capabilities; (4) advancing awareness of policy and public understanding through strategic communication and support for education and training; and (5) efficiently managing resources and support.[2]

The mission statement of the directorate is as follows:

> Through Executive Agent oversight and coordination, the Department of Defense Non-Lethal Weapons Program–comprised of Joint and Service programs–will serve as the Department's proponent to effectively identify, develop, test and evaluate, transition, field, and sustain integrated, relatively reversible, and scalable effects technologies and capabilities, and develop associated policies, doctrine, concepts, and training in order to provide timely solutions to current and future requirements across the range of military operations, maximize mission effectiveness, and minimize risk to U.S. forces, coalition partners, civilians, and critical infrastructure.[3]

When it was initially established, the Joint Non-Lethal Weapons Directorate was specifically chartered to stimulate and coordinate non-lethal weapons requirements. Today, the directorate functions as the DOD focal point through which services coordinate and integrate the development of all non-lethal weapons programs. The Commandant of the Marine Corps serves as the overall executive agent for the program, which is historically chaired by a three star Marine General and senior leaders from other services. Since its inception, the Directorate has worked with the other services to establish and operate an instructor school, field capability sets or kits of non-lethal weapons, and facilitate training for their use.[4]

It is important to note that in 1998, the Directorate established the technology investment program using three primary mechanisms by which the DOD could generate

new technologies: (1) using government laboratories to conduct testing; (2) academia to review studies and laboratory tests; and (3) commercial industry to help with developing new technologies.[5] The Directorate has several current technology investment programs that are ongoing or being initiated to develop new initiatives and assess the human effects.

During the past two decades, the Joint Non-Lethal Weapons Directorate has employed a strategy to develop mature non-lethal weapons technologies.[6] However, limited investment in research and development, the gap in educating commanders and end users on the human effects, and the lack resources for developing full system concepts has reduced the employment and military effectiveness of newer technologies. Presently, non-lethal weapons kits are distributed among Army and Marine units. These kits include low-impact projectiles, foams, nets, lasers, and warning devices. Active denial technology and directed energy systems meant to degrade equipment and neutralize personnel have been tested and approved for employment; yet this technology has not been employed in an operation to date. Because of the range of effects that non-lethal weapons can generate, it is apparent that the issues associated with their development and use is more complex than their lethal counterparts are.[7]

Legal Constraints

When reviewing the law of armed conflict, international law, and weapons use, just war theory is traditionally applied. Two aspects fall under this theory: (1) Jus ad bellum, which addresses the right to resort to war rather than attempting to resolve the matter through other elements of national power that fall under Diplomatic, Informational, Military, Economic (DIME); and (2) *jus in bello,* which consists of two

main principles by which the participants in war must abide: (a) discrimination and (b) proportionality.[8]

When discussing non-lethal weapons, *jus in bello* will be applied because it addresses the conduct of those actually involved in the fighting, whether they are uniformed combatants, paramilitary forces, or civilians who take up arms. These two main principles have been incorporated into the law of armed conflict, which ban indiscriminate or disproportionate force regardless of the weapon employed.[9]

There is a perception with non-lethal weapons technology that the military might use them in a less discriminate manner. The principle of discrimination is used to establish rules of engagement that authorize lethal force. The law of armed conflict forbids military personnel from deliberately targeting non-combatants. However, some advocates promote the use of non-lethal weapons in a manner that applies the discrimination principle after using the force rather than before. Michael L. Gross provides a good example of this:

> Unlike the use of ordinary weapons, non-lethal weapons deliberately target civilian noncombatants so that the harm they suffer is no longer incidental but intentional. Targeting civilians in this way requires that one subject the principle of noncombatant immunity to a 'lesser evils' test that compares a small amount of intentional harm with a greater level of non-intentional harm that comes from using high explosives. If the former is significantly less than the latter, then there are moral grounds to targeting civilian noncombatants with non-lethal weapons.[10]

The protocols in the Convention of Certain Conventional Weapons ban the use of weapons that are determined to cause disproportionate harm. This treaty is an imperfect attempt to enforce the principles of the just war theory, and it is increasingly challenging as international law has not been able to keep pace with emerging non-lethal technologies.[11] One place that this convention has been able to remain effective in the use

of non-lethal weapons in the ban on non-lethal riot control agents outside of domestic law enforcement use.

Chemical non-lethal weapons development for the DOD has virtually stopped due to the adoption of the Chemical Weapons Convention. There are compelling arguments for its utility in crowd control based on review of employment by domestic law enforcement agencies across the globe where the Chemical Weapons Convention does not have jurisdiction.[12] Non-lethal weapons technologies that fall under existing international conventions that prohibit the development, production, stockpiling, and use of chemical weapons have been deemed by the international community to be excessively injurious or to have indiscriminate effects.[13]

Since the Commandant of the Marine Corps was designated to serve as the executive agent for non-lethal weapons with the DOD, the Navy Judge Advocate General must review all emerging non-lethal weapons to ensure that they would not cause needless, excessive suffering that is disproportionate to the military advantage expected from the weapon. The Joint Non-Lethal Weapons Directorate ensures that all developing technologies are vetted and ultimately approved by this office before they are distributed for use within the DOD.[14]

Case Study Analysis

The following case studies provide historic context to further analyze the possible requirement and role of non-lethal weapons in the 2025 operational environment. The Camp Bucca riots provide excellent historic context to evaluate the proficiency of the existing technology found within the currently issued non-lethal weapons kits. The Russian response to Chechen attacks on a theater in Moscow and the British seizure of

Basra provide scenarios where perhaps emerging technology could have provided a better outcome. Collectively, they depict the types of emerging threats that may be faced in the future operational environment and analysis of these events with assist with identifying solutions that non-lethal weapons might provide the MAGTF commander when facing similar challenges.

Camp Bucca, Iraq Detainee Riots 2005

Background: Camp Bucca is a theater-level detention facility that was opened in 2003. Following the Abu Ghraib scandal and eventual closure in 2005, it became the largest facility in Iraq. During late 2004 and early 2005, large-scale riots occurred almost every month, and minor incidents occurred on a weekly basis. In almost all of these incidents, non-lethal weapons were employed to regain control. Half of the guard force at Camp Bucca were comprised of the 105th Army National Guard Military Police Battalion, which had been on duty for roughly four months. They were primarily assigned to the detainee facility with an on order mission to defend the camp if required. The other half of the force was from the 732nd Expeditionary Security Squadron, which had only arrived several weeks before. Its primary mission was to provide security to the remainder of the camp and provide the quick reaction force for the detention facility when requested by the 105th MPs.[15]

During the morning of 31 January 2005, guard personnel entered to conduct a routine search for contraband. Following the search, one of the detainees, who happened to be a Muslim cleric, accused the guard personnel of damaging several Korans. The word spread quickly throughout the compound, and a major uprising ensued. Initially, the

detainees began to push against the compound fence in an obvious attempt to escape. A large guard force responded to maintain order, but this only escalated the situation.[16]

The rules of engagement only allowed the use of force if guard personnel felt they or detainees were endangered. The guards initially used verbal commands over a loud speaker in an attempt to regain control and calm the situation.[17] Over three thousand detainees in five separate compounds began hurling projectiles over the five-meter fence at the guard force in the ten-meter towers. The detainees used makeshift slings to throw rocks and chunks of concrete they had broken off from the flooring on which their tents were placed. They also used hand sanitizer and plastic bags to make Molotov cocktails that were used to set responding vehicles and guard towers on fire.[18]

The guard force began to use available non-lethal weapons to defend themselves, having received no official order to fire. The detainees used sleeping bags and floorboards as shields against the non-lethal projectiles fired at them from shotguns, FN-303s (semi-automatic less than lethal paint ball gun), and M203 launchers. They withdrew to a safe range where the effects of the non-lethal rounds were limited, and then used quick, coordinated rushes forward from where they could hurl their weapons. In many instances, the detainees were able to outrange the guards, using their slings. This engagement lasted for over an hour before several guards, trapped in their towers and fearing for their lives, employed lethal force using M-16s to kill several detainees.[19] Word of the detainees' deaths quickly spread, and the situation was brought under control.

Lessons Learned: In the aftermath of the riots, there were many specific areas of concern identified by the guard force. The large number of detainees who participated in

the riots from five separate compounds were well coordinated and adaptive in their tactics. They quickly outmatched the available guard forces' ability to quell the disturbances, using available non-lethal technology. Additionally, they were able to trap the exposed guard personnel in the towers and deny the remaining forces from evacuating those personnel.[20]

Analysis of this case identified the key shortfall facing the guard forces in their attempt to subdue the rioting detainees as a lack of non-lethal weapons that could effectively range the aggressors. Due to their tactics and the size of the compounds, the detainees had an effective safe haven from the available technology where they could regroup and launch effective counter attacks against the guards. There is no magic bullet currently available, and the customary international law of armed conflict still requires avoiding unnecessary suffering, and discriminating between combatants and non-combatants. Not every detainee in the five hostile compounds was involved in the rioting, and therefore not everyone present should be targeted, if at all possible.[21]

Due to the clear level of coordination amongst the five separate compounds, it is assumed that prior planning had occurred, and this attack might have an attempt to test the 732nd since they had only arrived earlier that month.[22] The obvious what if in this scenario speculates, what possible riot control alternatives could have been employed to effectively disarm the aggressors before lethal force was applied? More generally, could other tactics and tools, including advanced non-lethal weapons or emerging technology, have accomplished the mission while protecting the guards, and without the employment of lethal force?

A possible solution to the capability gap that the guard personnel faced is active Denial technology. This technology uses a millimeter wave antenna to emit a directed beam of focused energy toward a selected human target or a group of people, and can range anywhere from 15-500 meters. When the beam reaches its target, it penetrates less than one millimeter of the skin causing stimulation of the pain nerves that exist there. It creates a heat sensation that becomes unbearable within seconds and forces the individual to move. The heat sensation ceases almost immediately after the target individual moves out of the beam.[23] When used properly, there is minimal risk to the target because of the shallow penetration. Additionally, there are safety features designed into the system to limit the likelihood of permanent damage. Irreversible effects exist, but only if the target remains in the beam for an extended period of time.[24]

This technology is well suited for this scenario, and might have provided the guards with the ability to reach the desired end state without requiring the use of lethal force. If an active denial system had been positioned on each guard tower, they would have been able to engage individuals or small groups across multiple compounds, denying them of the safe haven they enjoyed. Additionally, due to the precise delivery of the beam, they would have been able to reduce the likelihood of targeting innocent bystanders attempting to avoid the fray. With additional systems available on mobile vehicles, they could have reduced the effect of countermeasures that proved successful against the kinetic non-lethal weapons that were employed. Shielding against the beam would have been possible, but required materials that were difficult to obtain in that facility, and would have reduced the mobility of the detainees employing them. Multiple

active denial systems or the employment of kinetic non-lethal weapons in concert with the AD systems would be required to counter this tactic, if it were employed.[25]

For many of the detainees inside of Camp Bucca, this riot was a continuation of the insurgency still ongoing throughout Iraq. Others were actually innocent and yet to be charged. This population was likely frustrated, and felt they were being treated unjustly, which left them susceptible to recruitment by the insurgents with whom they were detained. How they were treated during this engagement, and others like it, likely had an effect on where their loyalties would lie upon their release. Therefore, treatment of detainees at Camp Bucca could have an operational and potentially strategic effect on Operation Iraqi Freedom.[26]

Employment of the available non-lethal technology failed in ultimately controlling the situation, but likely prevented additional casualties had it not been available. The employment active denial systems and other emerging technologies must be considered when searching for a better solution to similar challenges that will be faced in the future operating environment.

Russians and the Chechens 2002

"The whole idea of nonlethal chemical warfare agents is a myth," said Elisa Harris, a senior research scholar at the University of Maryland and a former Clinton administration National Security Council official. "Anyone who tries to suggest otherwise is ignoring the evidence."[27]

Background: On 23 October 2002, an estimated eight hundred people were enjoying a musical performance at the Dubrovak Theater Center in southeast Moscow, only three miles from the Kremlin walls. The crowd was mostly Russian, but it is

assessed that roughly seventy-five were foreigners. At about 9:00 p.m., fifty masked heavily armed men and women entered the theater and locked down the three-story facility. They detained all of the guests and performers inside, confined them to the auditorium, and placed a large amount of explosives amongst them.[28] They threatened to kill everyone unless Russia withdrew its military forces from Chechnya and granted them independence like the other Caucasian breakaways.

Over the next several days, the terrorists released several of the hostages, but negotiations with authorities eventually stalled. Moscow assessed that a peaceful resolution was not possible and began to believe that the Chechens intended to play the role of martyrs. The terrorists who were closely guarding the hostages wore suicide vests packed with plastic explosives for quick detonation in the event a rescue took place.[29]

Early in the morning on 26 October, several shots were heard from within the theater and one hostage was killed with several others being wounded. No one outside of the theater could determine if an indiscriminate execution of the captives was taking place. Around 5:15 a.m., Russian Special Forces began pumping a chemical narcotic gas derived from Fentanyl through the theater's ventilation system. Almost everyone inside started losing consciousness, and even though several of the terrorists began to realize what was happening, they succumbed to the effects before they could detonate the explosives in theater. The gas rendered everyone in the theater immobile, but some of the terrorists stationed in the hallways next to the auditorium remained unaffected.

By 6:00 a.m., two hundred Russian Spetsnaz forces launched an assault on the theater from multiple points of entry. There was a brief firefight with the unaffected gunmen in the hallway, but the resistance was quickly suppressed. Once the Spetsnaz

forces reached the theater, they quickly shot and killed all of the remaining terrorists. They immediately began defusing all of the explosives inside and evacuating the hostages out of the building to emergency personnel and ambulances waiting outside.[30]

The roughly 450 medical teams awaiting patients were not advised they would be receiving chemical casualties and their emergency triage procedures were insufficient. Medical personnel did not have enough antidote on hand, and had no idea what dosage should be administered because they did not know what sedative they were trying to counteract. The failure to disclose this information to the awaiting medical personnel significantly limited their ability to effectively treat their patients. In the end, all of the terrorists were killed by gunfire and 15 percent of the hostages died due to the effects of the narcotic gas. None of the Spetsnaz troops were killed in the assault, and only nine were injured due to the effects of the gas. To date, Moscow has never released the quantity or type of gas that was used in the Dubrovka Theater assault.[31]

Lessons Learned: It is difficult to determine whether this raid qualified as a success. The fanatic Chechen terrorists appeared ready to die for their cause, and negotiating a peaceful outcome without giving into all of the Chechen terrorist's demands was unlikely. Both Russian President Vladimir Putin and U.S. Ambassador to Russia Alexander Vershbow, pronounced the operation a qualified success, given that the alternative of a detonation of the estimated two hundred and fifty pounds of explosives was avoided.[32]

The evidence suggests that had Russian officials provided the awaiting medical personnel with more information regarding the type and quantity of chemical that was used to sedate the terrorists, they could have saved many, if not all of the 127 civilian

victims. Fentanyl is not classified as a chemical weapon under the Chemical Weapons Convention, and Russia has yet to register whatever chemical they used under the treaty.[33] Typically, when this drug is administered, it is in a controlled hospital environment where the physicians are well aware of the health profile of the patient. In this scenario, there are varying degrees of individuals with unknown health concerns in a highly stressful environment with limited access to food and water for over fifty hours. There was no way for the Russian troops to administer a precise dosage to each individual in a facility this large, so it is likely that a large quantity was pumped into the theater to ensure the desired effect on everyone inside, large or small.[34]

When reviewing this scenario against the Chemical Weapons Convention, it is assessed that the use of chemical riot control agents was authorized. The scenario happened inside of Russia; therefore, this should be classified as domestic law enforcement where the Convention has no authority on riot control agents. If this was determined to be an extension of the fighting surrounding Chechnya, then this situation could be classified as armed conflict. Under that assumption, this would be considered a use of toxic chemicals that failed to discriminate between combatants and civilians, and therefore would be deemed illegal by the Convention.[35]

The speculative question for this scenario is whether other tactics coupled with advanced non-lethal technology could have disarmed the terrorists while protecting the hostages without the use chemical agents at all. The research conducted for this thesis failed to identify any known chemical compound that could have the desired effect of rendering everyone safely unconscious with reversible effects for everyone involved. Active Denial systems, acoustic systems, flashbangs, or even sticky foam could have

been used to assist to safely immobilize both terrorists and non-combatants. However, denying the Chechen terrorists the ability to detonate their explosive devices once they realized a full-scale raid was under way would have proven very challenging.

Where non-lethal devices could have been useful in this situation, is aiding in the detention of everyone inside the theater once the raid commenced. It is still unclear why the Russian Spetsnaz troops decided to execute every unconscious terrorist inside of the theater. Non-lethal restraint systems and pain compliance systems could have aided in disarming and controlling any individual in the theater, and increased the likelihood of reversible effects. This is valuable in a scenario where it is highly likely that force might be applied on a hostage who was misidentified in the chaos or used as a human shield.

Incidents like the Kenyan Westgate mall attack on 21 September 2013 conducted by Al-Shababb linked armed gunman or the recent Paris attacks on 13 November 2015 show evidence that scenarios like this are likely to continue occurring around the world.[36] At some point, an attack will require a US responsive force, and a MAGTF commander is likely to be faced with determining how to proceed. An understanding of available and emerging non-lethal technology could provide additional solutions to increase the survivability of all involved. It is important to note that in these scenarios, lethal force was still required, and no existing non-lethal technology could have brought them to a peaceful solution by itself.

British seizure of Basra, 2003

Background

The final case study focuses on a conventional military fight that in many ways is similar to the hypothetical operational environment that is anticipated to exist in 2025. In

2003, during the Iraq invasion, Basra was Iraq's second largest city with an estimated population of one to two million. It is an ancient city located at the convergence of the Tigris and Euphrates Rivers just north of Iraq's only port on the Persian Gulf. The bulk of the inhabitants of this city are Shia Muslims, who form the majority population in Iraq. For many years, they were oppressed by Saddam's regime, which was predominately Sunni. This was important to note because it was assumed by the coalition that the majority of the residents would be receptive to the coalition invasion.[37]

The coalition war plan for Iraq was focused on speed and flexibility, targeting key cities and infrastructure on the race north to remove Saddam Hussein from power. One of the initial objectives was the city of Basra. The plan was for the U.S. forces to quickly defeat any organized Iraqi forces there, and continue the assault northward, leaving any pockets of resistance for the following British forces. The assumption was an overwhelming show of force coupled with the support of local inhabitants would quickly suppress any remaining Saddam supporters and avoid prolonged fighting. This early operation was of strategic importance from an information operations perspective. The goal was to showcase a coalition force welcomed by Iraqi civilians as liberators vice foreign invaders.[38]

The first phase of the plan for Basra went off as intended. Within roughly twenty-four hours of crossing the Kuwait border, U.S. and UK forces had cleared the port city of Umm Qasr, and Basra was mostly surrounded by British with U.S. forces continuing the march north. Basra was defended by a relatively small force that consisted of elements of the 51st Mechanized Division outfitted with T-55 Soviet-era tanks and a few hundred Fedayeen. Ali Hassa Al-Majid, a cousin of Saddam who is notoriously known as

Chemical Ali from when he used chemical weapons against the Kurds in the northern part of Iraq in 1988, commanded this force. During the planning, the coalition anticipated that the forces remaining in Basra would surrender due to the overwhelming display of the coalition forces and an anticipated uprising of the inhabitants of the city. This would allow the British to avoid a difficult house-to-house fight that would not only create significant coalition casualties, but also damage key infrastructure and likely increase the number of innocent civilian casualties.[39]

The first challenge that the British forces faced was a humanitarian crisis. Shortly after surrounding the city, the electricity network began to fail, and the water treatment facilities became inoperable without power. The residents were effectively trapped in the city with no access to safe drinking water, and the majority of the city was without lights. Food supply was not an immediate issue, but it was quickly assessed that this would also become a problem that needed to be resolved if the defenders of the city were not defeated quickly.

The British force was hesitant to enter the city and engage in highly kinetic fighting, and Chemical Ali's defenders quickly adopted guerilla tactics to counter their numerically and technologically superior opponent. They placed their headquarters near schools, residential neighborhoods, and hospitals to increase the likelihood of collateral damage if attacked by air strikes or artillery. Many removed their uniforms, opting to dress and fight as civilians, and even used children as human shields. Resistors attempting to aid the coalition were executed by the Fedayeen, or forced to wear suicide vests and attack the British to protect their families. The leading local Shite cleric was assassinated.[40]

The coalition was able to launch a limited number of precision bombing raids to destroy key targets, but most objectives were too risky to strike. The British established checkpoints along the main roadways exiting the city to inspect civilians trying to flee the city and deny the defenders a safe passage out. They occasionally executed limited raids into the city that were successful at quickly seizing key Ba'ath officials when intelligence could confirm their location. After roughly three days, some 25,000-coalition forces controlled the surrounding area, but did not achieve any success gaining ground inside Basra itself. A stalemate ensued that lasted for roughly two weeks, during which the British force improved their ability to control of what entered or exited the city. Intelligence improved, air strikes within the city became more successful, and small-scale raids into the city engaged in brief, yet successful firefights before withdrawing. The defenders executed limited attacks on British encampments, hoping to draw the coalition force into a close quarters fight, but the British held firm and did not engage for fear of disastrous consequences and significant collateral damage to both key infrastructure and the civilian inhabitants.[41]

Basra no longer appeared to be the easy victory prompted by the local populace uprising against their aggressors. The British forces did not inflict damage on the civilians or key infrastructure within the city, which was a desired effect of the operation. However, the lack of humanitarian relief and the increasing amount of human suffering that occurred due to the cautious action against the Fedayeen created an unanticipated crisis.[42]

On 6 April, after seventeen days surrounding the city, British forces launched an operation to the heart of the city. Unlike, previous raids where they retreated shortly after

making contact, they were there to stay. They quickly occupied key infrastructure inside the city, and engaged in a day of fighting small pockets of resistance. After the major fighting ceased, the British force suffered only three killed in action, and it is assumed that the defenders suffered over three hundred fatalities. The local population quickly realized that the coalition was finally there to stay, and responded well to their Western liberators. They pointed out the locations of weapons caches and remaining Ba'athists and Fedayeen, often taking up arms themselves to conduct revenge killings against their former oppressors. Former government buildings, vehicles, equipment, and privately owned property were looted, destroyed, or stolen by the freed population as they released years of pent up aggression from suffering under the Saddam regime.[43]

The coalition forces were now challenged with facing the "three block war" as they attempted to bring Basra under control. They still encountered pockets of conventional and urban guerilla forces, and they were confronted with enforcing the law, establishing civil governance, and reducing human suffering. When the violence subsided, there was limited damage to most of the city, but the vital infrastructure remained intact. Humanitarian aid arrived quickly, and essential services were restored in short order. A portion of the residents were upset with the effects the war had on their family and city, but many assess that this number would have been significantly higher had the British launched a major urban assault to defeat the Fedayeen.[44]

Lessons Learned

Is it possible that current and emerging non-lethal weapons technology could have assisted the British force with seizing Basra quicker while still achieving the desired effect of limiting human suffering and collateral damage? When accessing this operation

against the available technology in 2003, the answer might in fact be no. However, current and emerging non-lethal solutions used in concert with existing lethal technology might have proven reliable in allowing the British force to gain footholds in Basra more quickly, and could have encouraged the local population to rise up against their oppressors earlier in the operation.

When conducting stability operations, it is imperative to build trust and improve conditions in order to keep a supportive population from turning hostile and aggravating an already volatile situation. Fortunately, for the British, many of those involved in this operation had experience in the domestic conflicts in Northern Ireland. They were able to apply their understanding of urban conflict coupled with providing civil services to promote some semblance of law and order while combating the defenders. The leadership displayed amazing restraint when faced with growing pressure to speed up the operation and continue onto Baghdad.[45]

When the humanitarian aid began to reach the city, it is natural to expect that many of the non-combatants could have felt desperate and therefore act violently in an attempt to obtain aid for themselves and their families. Riot control agents could have been employed to reach the objective of ensuring orderly distribution and protecting the non-combatants seeking aid.

The checkpoints that controlled the flow of traffic in and out of Basra were another location where current non-lethal technology could have greatly assisted the coalition to determine friend from foe. Throughout the course of the Iraq campaign, this was an area where escalation of force and force continuum procedures were improved dramatically through the employment of non-lethal technology. Incidents of civilian

deaths decreased considerably over time as acoustic devices, lasers, and non-lethal projectiles assisted in identifying hostile intent.

It is important to note that had the British force been required to carry overlapping, non-lethal capabilities, it is safe to assume they would have been required to sacrifice some lethal options. This would have also levied additional requirements to maintain and supply these systems, straining an already complex sustainment plan. It is incumbent on the Joint Non-Lethal Weapons directorate to ensure that emerging systems continue to provide flexibility between lethal and non-lethal systems, and reduce the risk of making the force unable to ensure it can defend itself in a kinetic environment.

Primary Research Question Summary

By comparing the data collected from various resources, the author sought to create an appreciation for the limitations and capabilities of employing non-lethal weapons in military operations. In the future complex operating environment, MAGTF commanders will be expected to maintain their lethal capabilities, while being prepared to counter hybrid threats. Commanders will be expected to balance their focus and efforts on maintaining the ability to dominate a lethal engagement while limiting suffering to non-combatants and infrastructure.

Advancements in non-lethal weapons technology, coupled with education and training on existing systems, will be paramount to ensure that non-lethal weapons are being employed to increase the likelihood of mission success. Creative and innovative mindsets that see the value in this technology will be necessary to adapt to every changing environments, and allow MAGTFs to prevail in the future operating environment.

Secondary Research Questions

What is Public Opinion on the Employment of Non-Lethal Weapons?

Public awareness of these systems is important to achieve the desired support. The Joint Non-lethal Weapons Directorate is heavily invested in improving public education of existing and emerging technologies. However, there is an existing challenge not to oversell the technology as these systems only reduce the probability of lethality, and unintended victims will continue to occur. There are still several critics who are skeptical and challenge these systems, but largely, most literature on the subject supports the overall objective of reducing human suffering and collateral damage. Public support appears to be growing, and with it comes the expectation that the DOD will be capable of showing restraint and reaching its desired end state with less bloodshed and destruction.

Is the DOD Developing Relevant Capabilities for the Future Threat and Environments?

The rationale for non-lethal weapons use within the DOD appears to be getting stronger, but they are still not well understood by the average war fighter. Without the constant development of new technology, non-lethal weapons will likely remain a specialty item that never truly reaches its full potential. The current off-the-shelf systems have proven during testing that they can provide great advantage to the force during combat operations in urban terrain. Emerging technologies are expected to only increase this advantage and add another tool to the end users kit. However, stimulating understanding amongst the individual services, and creating a shift in the warfighting culture is required to create the necessary advocates.[46] Until commanders completely understand the utility of these systems and decide to employ them to their fullest

potential, it is assessed that DOD will never gain the required confidence needed to upgrade the non-lethal weapons enterprise funding to reach its potential value.[47]

Can Marines Carry Existing Non-Lethal Weapons Equipment Without Giving Up Critical Lethal Capability?

Upon review of the existing and developmental non-lethal technology, it is difficult to see how Marines can carry non-lethal technology without giving up some lethal capabilities. Current combat loads already add between forty and one hundred extra pounds of equipment that each individual is expected to carry. Additionally, there is a requirement to give up training time on existing lethal systems to become proficient on any new system. The question is then whether giving up some lethal capability in exchange for non-lethal systems will make the force, as a whole, more successful in limiting human suffering, damaging key infrastructure, and ultimately assist in achieving the desired end state.

Summary

A large population of skeptics still exists who challenge the relevance of non-lethal technology in both today's and future operational environments. Their concerns stem from legal worries, the longstanding kinetic culture of the military, and lack of available training time deploying units have to prepare for deployments.

The analysis of the aforementioned literature depicts some of the challenges that commanders will face when operating in the hypothetical 2025 environment, and the case studies legitimize the growing need for a capability between shouting and shooting. In the final chapter of this thesis, conclusions will be offered from the research conducted and the lessons learned assessing the preceding case studies.

[1] Koplow, “Red-Teaming,” 230.

[2] Fridman, 72-73.

[3] Department of Defense, “Vision, Mission,” Non-Lethal Weapons Program, accessed 14 February 2017, http://jnon-lethal weaponsp.defense.gov/About/Vision,Mis sion,Definition.aspx.

[4] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., 40-47.

[5] Ibid.

[6] Metz, “Non-Lethal Weapons,” 19-20.

[7] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., 7-8.

[8] Enemark, 200-201.

[9] Coleman, 191-192.

[10] Gross, “The Second Lebanon War, 15-16.

[11] Coleman, 187-191.

[12] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., 105-106.

[13] Massingham, 679-680.

[14] US Navy, “Review of Weapons under International Law,” Secretary of the Navy Instruction (SECNAVINST) 5711.8A, 29 January 1988; US Navy, “Implementation of Defense Acquisition Management Policies, Procedures, Documentation and Report,” SECNAVINST 5000.2B, 6 December 1996.

[15] Orbons, “Assessing Non-Lethal Weapons,” 466-468.

[16] Ibid., 466-470.

[17] Orbons, “Assessing Non-Lethal Weapons,” 466-469.

[18] Bradley Graham, “Prisoner Uprising in Iraq Exposes New Risk for U.S.,” *Washington Post*, accessed 13 February 2016, http://www.washingtonpost.com/wp-dyn/articles/A40411-2005Feb20.html.

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[20] Graham.

[21] Orbons, "Assessing Non-Lethal Weapons," 466-470.

[22] Ibid.

[23] Annati, "Non-Lethal Weapons,"53.

[24] Orbons, "Assessing Non-Lethal Weapons," 469-474.

[25] Annati, "Non-Lethal Weapons," 53.

[26] Orbons, "Assessing Non-Lethal Weapons," 469-474.

[27] Guy Gugliotta, "U.S. Finds Hurdles in Search for Nonlethal Gas," *Washington Post*, 1 November 2002, under A30, accessed 6 March 2016, http://www.hartford-hwp.com/archives/27a/136.html.

[28] Artem Krechetnikov, "Moscow Theatre Siege: Questions Remain Unanswered," *British Broadcasting Corporation (BBC)*, 24 October 2012, accessed 14 February 2016, http://www.bbc.com/news/world-europe-20067384.

[29] Koplow, 101-102.

[30] Ibid., 102-104.

[31] Ibid., 103-104.

[32] Michael Wines, "The Aftermath in Moscow: Post-Mortem in Moscow; Russia Names Drug in Raid, Defending Use," *New York Times*, 31 October 2002, accessed 14 February 2016, http://www.nytimes.com/2002/10/31/world/aftermath-moscow-post-mortem-moscow-russia-names-drug-raid-defending-use.html.

[33] Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction.

[34] Gugliotta, A30.

[35] Ibid.

[36] New York City Police Department, *Analysis of Al-Shabaab's Attack at the Westgate Mall in Nairobi, Kenya* (New York: New York Police Department, 2013), 4; Sybille Hamaide, "Timeline of Paris Attacks According to Public Prosecutor," *Reuters*, 15 November 2015, accessed 10 February 2016, http://www.reuters.com/article/us-france-shooting-timeline-idUSKCN0T31BS20151114.

[37] Tim Butcher, "Battle for streets of Basra," *The Telegraph*, 31 March 2003, accessed 14 February 2016, http://www.telegraph.co.uk/news/worldnews/middleeast/iraq/1426191/Battle-for-streets-of-Basra.html.

[38] Koplow, 115.

[39] Ibid., 115-116.

[40] Olga Craig, "Four Miles into Basra, Angry Iraqis Stare at Me in Disbelief," *The Telegraph*, 30 March 2003, accessed 15 February 2016, http://www.telegraph.co.uk/news/worldnews/middleeast/iraq/1426105/Four-miles-into-Basra-angry-Iraqis-stare-at-me-in-disbelief.html.

[41] Butcher.

[42] Koplow, 117-119.

[43] Ibid., 121-123.

[44] Ibid., 122-123.

[45] Ibid., 124-127.

[46] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., 98-112.

[47] Koplow, 142-149.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

> The challenge to accepting non-lethal weapons as an integral element of the warfighter's toolkit requires a cultural shift that is counterintuitive to the military, which understandably emphasizes the use of lethal force.
>
> — Tracy J. Tafolla, *From Niche to Necessity: Integrating Non-Lethal Weapons into Essential Enabling Capabilities 2012*

As U.S. Forces train and prepare for the future operating environment, it is clear there is value added by using non-lethal weapons to address the military use of force dilemmas that commanders will face in the future operating environment. The evidence suggests that the Joint Non-Lethal Weapons Directorate must continue to be empowered by the DOD to identify and develop emerging ideas to will fill the technology gaps that exist between shouting and shooting. The overall program must continue to educate commanders on the effects of non-lethal weapons, and how their employment can enhance their ability to reach desired end states. This education will require an increased level of commitment from the individual services and a focused command emphasis.

According to the primary assumptions listed in chapter 1 and the analysis conducted, current and developing non-lethal weapons equipment can fill a lot the existing technology gaps. The analysis demonstrates the potential to facilitate a MAGTF commander's ability to employ current and next generation non-lethal weapons when facing hybrid challenges that combine conventional war, irregular challenges, terrorism, and criminality. These systems will enable commanders to respond to the 2025 environment with actions that are consistent with the Nation's values and commitments to minimizing collateral damage and human suffering. Research also suggests that non-

lethal weapons will assist warfighters with identifying noncombatants from violent actors. It also has the potential to increase the survivability of the force and legitimize the perception of U.S. actions from the international community.

An analysis of the research identified two underlying concerns about expanding their use to fill the existing technology gap. First, non-lethal weapons are, at best, a niche capability, mostly used in a limited role during peacekeeping operations or in support of force protection rather than viewed as an enabler for traditional warfighting missions. Operations during the past three decades have increased awareness of the benefit of non-lethal options, but increased advocacy within the services has not led to a surge in the employment of recently developed technology, like the active denial system or directed energy weapons. Additionally, non-lethal weapons research and development spending was not exempt to the DOD spending cuts since 2013, with directed energy research only receiving $209 million of the $244 million that was originally forecasted annually.

Second, major changes in the culture of the warfighters are needed to achieve the potential of non-lethal weapons for U.S. forces in general. There has been an upgrade in the U.S. Government's non-lethal weapons enterprise over the past decade; but coordination with the Department of Justice and other key federal players, who can help advance this technology, has been limited. Greater support is being demonstrated by top level leaders in the military, but coordinating these programs with allies has been mostly limited to the PACOM AOR. The research suggests that battalion, brigade, and regimental commanders are only likely to advocate for these systems if they have had operational experience employing them.

Operational experience within the DOD is mostly limited to law enforcement personnel and members involved in escalation of force scenarios at entry control points and vehicle check points in Iraq and Afghanistan. Commanders, who have used them as far back as Kosovo and Somalia, have become vocal advocates for the technology even though there a significant differences between operational environments.[1] However, this population has remained too small to influence the enterprise as a whole. There has been a continuation of high level conferences and exercises that has increased interest and awareness of this technology. The annual Non-Lethal Weapons Executive Seminar (NOLES), which rotates to a new location within Pacific Command annually, has grown to hosting over twenty different nations and hundreds of participants. NOLES is promoting awareness of the effective use of this technology to the warfighters as highlighted by Brig. Gen. Richard Simcock, Deputy Commander of MarForPac.

> For well over a decade, the U.S. Marine Corps continues to advance the development and use–tactics, techniques, and procedures–of non-lethal weapons. . . . As a Marine infantry officer, I am intimately familiar with the application of lethal force. We all know that we must be able to apply lethal force when the situation dictates, but what is equally important today is how to de-escalate a potentially lethal engagement.[2]

However, this increased awareness has not led to a significant increase in research and development funds from the individual services. DOD as a whole has increased funding for the Joint Non-lethal Weapons Directorate over the past decade, but service pipelines outside of limited sourcing from the Army and Marine Corps has been relatively dry.

Opposing Views

Non-lethal weapons advocacy and employment has grown considerably over the last two decades (1993-2016), but even with this advancement, a small vocal group of

opposition still exists. Their primary concerns are focused on the perceived notion that governments will inevitably become more likely to commit military resources because less violent technology will make military action more politically acceptable. The Non-lethal Weapons Directorate and other stewards of this technology must continue to lead the debate on the proper use of this technology and ensure that training takes into account the just war tradition of discrimination and proportionality of means when applying force.

The future operational environment still poses a challenge of searching for a means to defeat guerilla and insurgency forces while sparing the surrounding civilian population and infrastructure. It is imperative that leaders remain aware that non-lethal weapons still pose a risk to causing fatalities and affecting the civilian death toll. These weapons must not be misused by military personnel to skirt international law just because it might be politically attractive. Employing non-lethal weapons in a harmful manner because of the perceived notion that there will be little to no traces of evidence on the victims must be avoided at all costs.

Recommendations

Individual Service Commitment

The Joint Non-lethal Weapons Directorate is the premier organization within the Department of Defense for expediting the transition of this technology from a specialty weapon to a fully integrated system within warfighting organizations. The Directorate must find new and innovative ways to expand the DOD's understanding of the effects of this technology and how to integrate it into their organizations. Individual services must be educated and convinced of the value of this technology until the Directorate achieves a service level commitment to resource research and development in house. When services

begin to fund the development of this technology, the partnership will increase the requirement for individual services to develop new doctrinal ways to employ this technology during the execution of suitable missions that could benefit from less than lethal technology.

Research and Development

Once the directorate achieves service level commitment to the development of non-lethal technology, the directorate can transition to become the ‘center of excellence’ where they assist with stimulating new concepts and investing in promising technological advances. The directorate will be able to continue coordination with both domestic and global laboratories, law enforcement partners, and industrial developers to advance new ideas that will assist with filling the existing technology gap. The directorate should also remain the focal point for testing and analyzing the human effects as new non-lethal weapons systems emerge, sharing the cost with individual services. This will ensure individual ownership from the services, while also increasing the likelihood of successfully clearing the acquisition process. One of the remaining shortfalls in the development of this technology is realistic rigorous examination that can identify the effectiveness of emerging non-lethal weapons systems. Currently, these weapons are tested on healthy subjects in very controlled environments. The directorate must continue to sponsor more robust field testing to validate these systems in realistic scenario based evaluations. Emerging systems must achieve satisfactory human effects when employed to assure the force of their reliability to the warfighters.

Training

The Inter-service Non-lethal Weapons Instructor Course at Fort Leonard Wood, Missouri currently serves as the lone course for certifying Department of Defense personnel as non-lethal weapons instructors. This course has instituted a comprehensive training program that prepares its graduates to understand what the current technology can and cannot do, and how to properly employ these systems throughout the range of military operations. Topics include force continuum, riot control formations and techniques, expandable baton techniques, oleoresin capsicum aerosol training, crowd dynamics and crowd control, open-hand control techniques and communication skills.

Upon graduation, certified instructors become subject matter experts for a unit commander on non-lethal weapons tactics, techniques, and procedures. There is a focus on incorporating these systems into formations that also carry lethal capabilities, as non-lethal technology should never be used without the ability to span the entire force continuum. Graduates understand the full range of likely effects and common countermeasures that can be used against them. This training has proven very effective and its graduates are in high demand throughout the services and combatant commands. The challenge remains maintaining a capable number of instructors in the operating forces to meet the increasing demand for certifying units in the employment of non-lethal technology as part of their pre deployment training.

The one concern with this training is that there is a focus on policing operations and not support to all military operations. Future training needs to be focused on a diverse collection of operational scenarios in which non-lethal weapons could provide a viable options to a commander. Instructors should leave the school house prepared to use these

scenarios when training other audiences in order to stimulate new ideas and encourage better understanding of how this technology can be used to achieve mission success.

Culture

Police associations and para military organizations provide a wealth of historical employment data that far surpasses the US military up to this point.[3] Where data is relevant and provides a framework for determining the potential value of these technologies, the scenarios are not always comparable. For starters, the basic-trained military service member is typically trained for combat. More specifically, they are trained to kill and the standard equipment they are issued focuses on two purposes. (1) To kill enemy personnel or (2) protect their fellow soldiers and marines from enemy personnel. The range of force options provided to police officers is a direct correlation to the role that they play in society and the various situations they may be put in.

Simply issuing non-lethal weapons will provide another option to the military. The required training and, more importantly, the shift in mindset is not easily achieved with all of the other competing requirements for warfighters to be prepared to accomplish their primary mission. The necessary shift in mindset must begin to be established in basic training and sustained through follow on training. This change will not occur over night and requires service level commitment to the value non-lethal technology has in increasing the likelihood of mission success.

Advocates to this shift in culture must find a way to sell this change, while ensuring that it is understood that non-lethal weapons will not replace traditional lethal capabilities. They must be offered as a supplement, providing a more flexible capability

that is worth the risk that is encountered by employing intermediate devices without ever relinquishing their ability to engage combatants with decisive lethal force.

Conclusions

The last fifteen years of war (2001-2016) have only intensified the need for a technology that fills the gap between shouting and shooting. This increased demand will likely surge in 2025 operational environment. Now is the time to highlight this vulnerability and capitalize on the growing demand signal and number of experienced operators and commanders advocating for non-lethal options.

The Joint Non-lethal Weapons Directorate must accelerate the creation of formal doctrine for the employment of non-lethal technology during this critical time. The services must ensure that they are integrated into expeditionary forces that can continue the generation of understanding the value in both offensive and defensive operations. This will assist in ensuring adequate funding is available to support development and testing to increase the likelihood of creating a mechanism to ensure that non-lethal weapons become fully integrated into development systems, high-level wargames, simulations, and studies.

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[1] Committee for an Assessment of Non-Lethal Weapons Science and Technology et al., 4-5.

[2] Marines.mil, "U.S. Marine Corps Forces, Pacific: In Any Clime and Place," 27 August 2013, accessed 2 February 2016, http://www.marforpac.marines.mil/News/NewsArticleDisplay/tabid/919/Article/530657/non-lethal-weapons-leadership-seminar-begins-field-training-ends.aspx.

[3] Jesse Wozniak, "Real Men Use Non-Lethals: Hegemonic Masculinity and the Framing of Police Weaponry" (University of Minnesota, 2006), 1-25.

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